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Strategies and Tools to Inform Cancer Diagnosis

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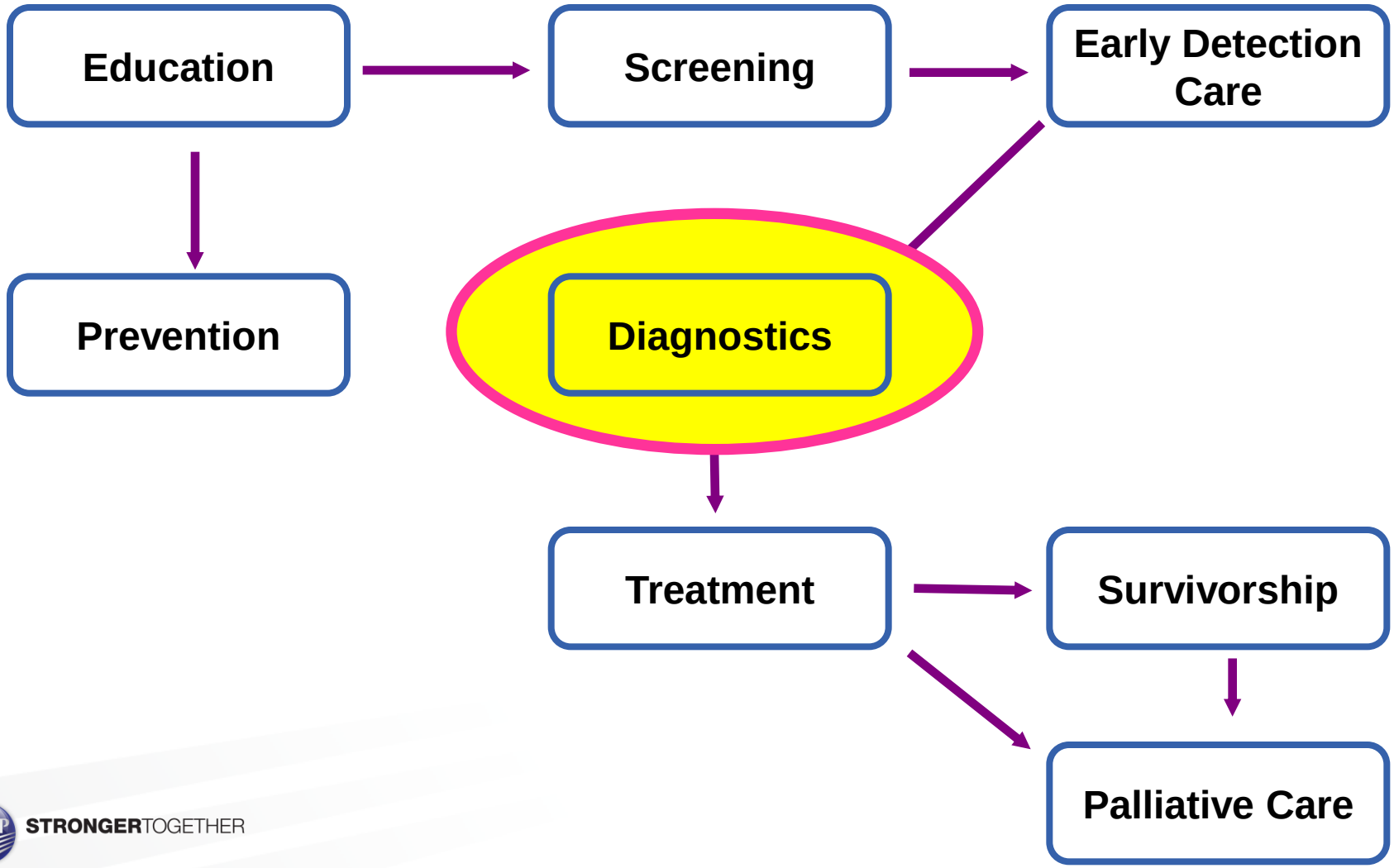
The Continuum of Care and Services



Matching Tools for Impact with Cancers

Diseases amenable to risk reduction

Tobacco related – lung, head and neck, bladder
HPV – cervical, head and neck
Hepatitis, alcohol - hepatocellular

Diseases curable with early detection and treatment including surgery

Breast cancer
Cervical cancer

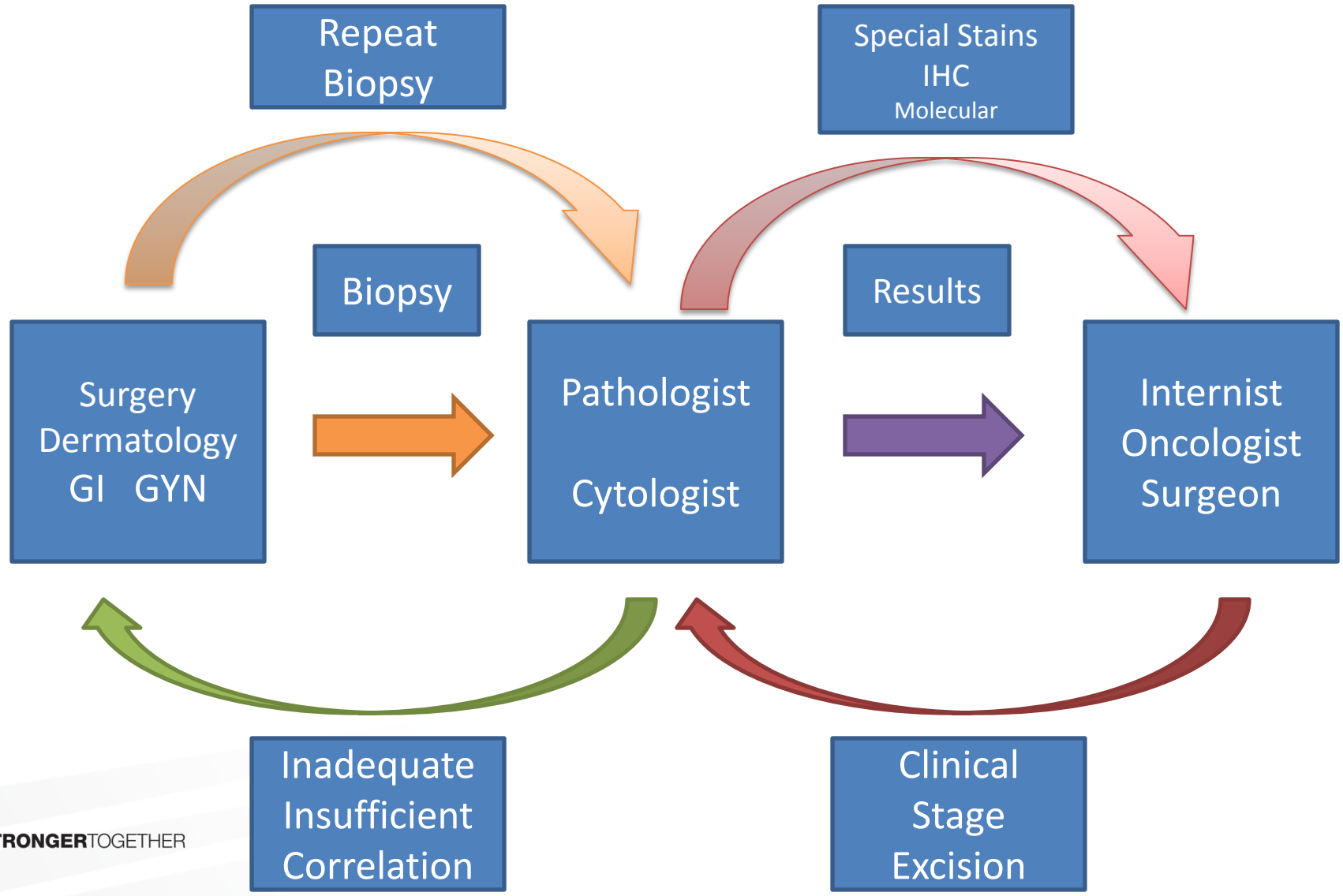
Diseases curable with affordable chemotherapy

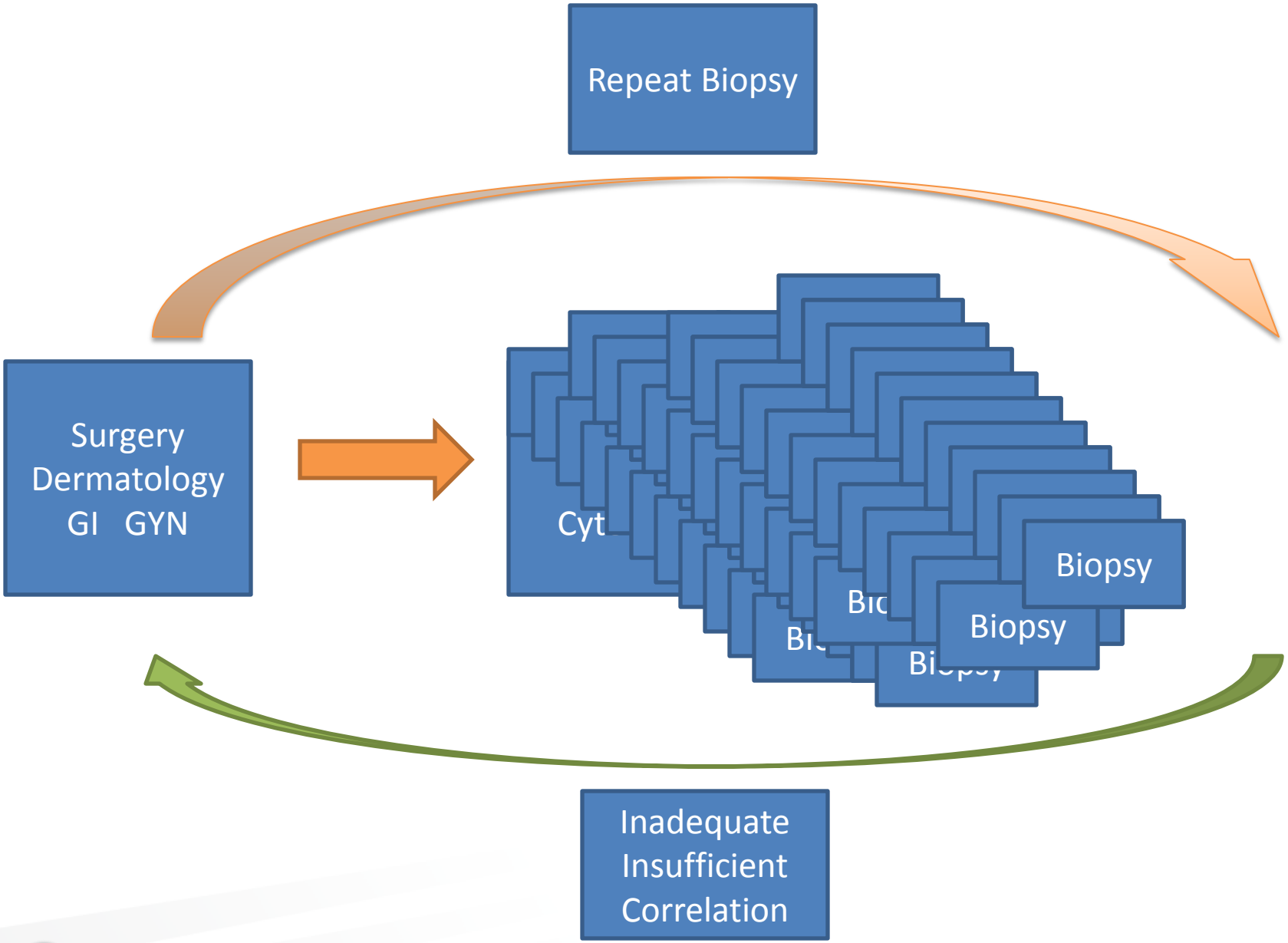
Non-Hodgkin's Lymphoma (Burkitt's/Large cell), Hodgkin's Lymphoma, Testicular cancer, Sarcoma in children, Acute Lymphoblastic Leukemia in children

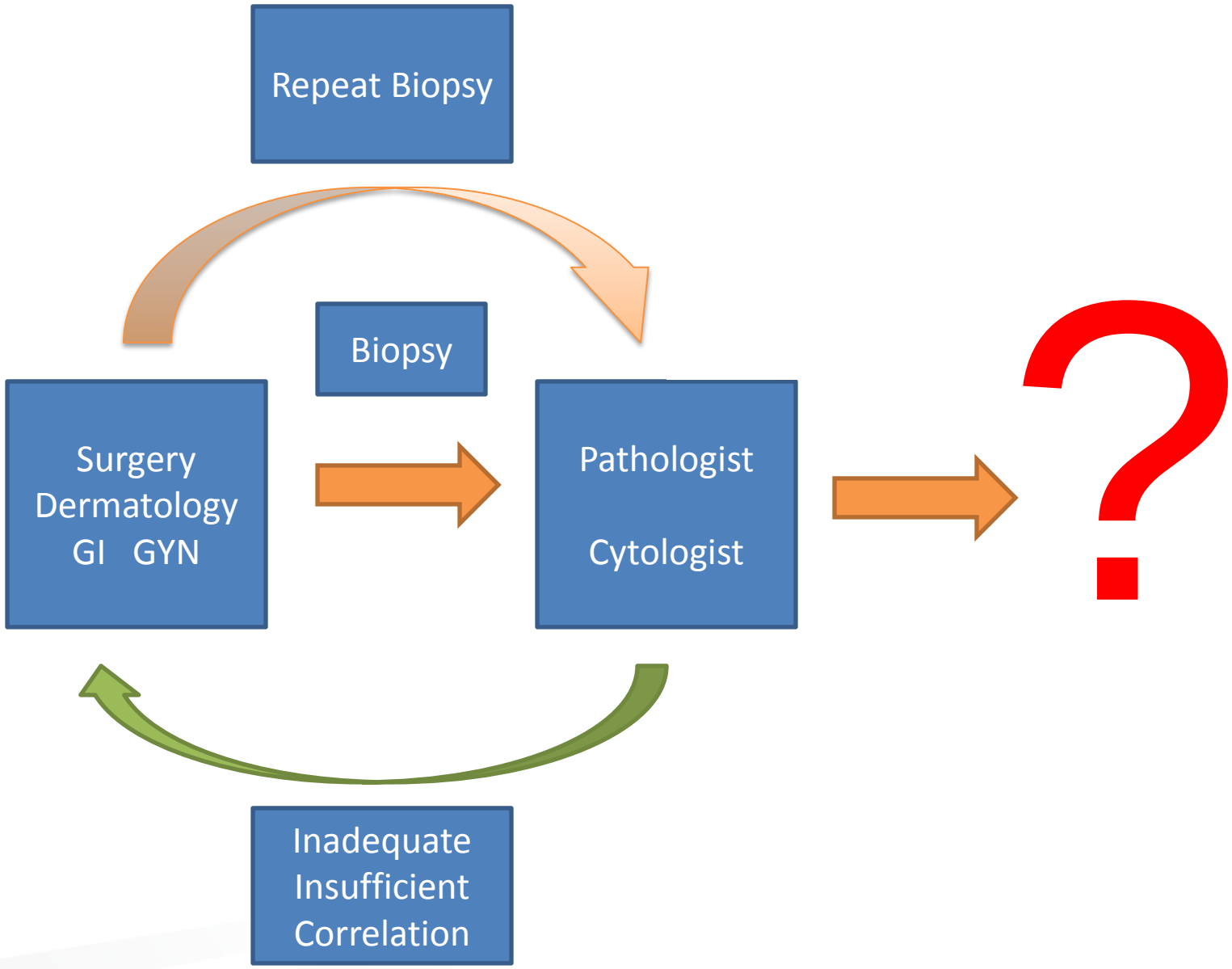
Diseases palliated with systemic treatment

Chronic Myelogenous Leukemia
Kaposi's sarcoma

The "Standard" Process of Cancer Diagnosis




Repeat Biopsy
Surgery
Dermatology
GI GYN
Cyt
Biopsy
Biopsy
Inadequate
Insufficient
Correlation


Repeat Biopsy
Biopsy
Surgery
Dermatology
GI GYN
Pathologist
Cytologist
?
Inadequate
Insufficient
Correlation

The Cogs of the Wheel

Surgeons without pathologists can not:
Predict recurrence
Plan additional surgery
Inform patient of results

Pathologists without clinicians:
Are not held to turn around time
Are reporting results to the air
Do not contribute to outcomes

Delays in diagnosis:
Invalidate results (good or bad)
Cause apathy among surgeons and clinicians
Decrease the quality of care for all patients

Without an intact system, healthcare is inferior and non-functional

Number of People Served By Each Pathologist in Sub-Saharan Africa

- No Active Pathologist
- >5.0 million
- 2.5-5.0 million
- 1.0-2.5 million
- 500,000-1 million
- 200,000-500,000
- Data Not Available

Number of People Per Pathologist:
UK*: 15,108 US**: 19,232

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*Royal College of Pathologists, 2012,
**Anatomic and Clinical Pathologists, AAMC, 2007

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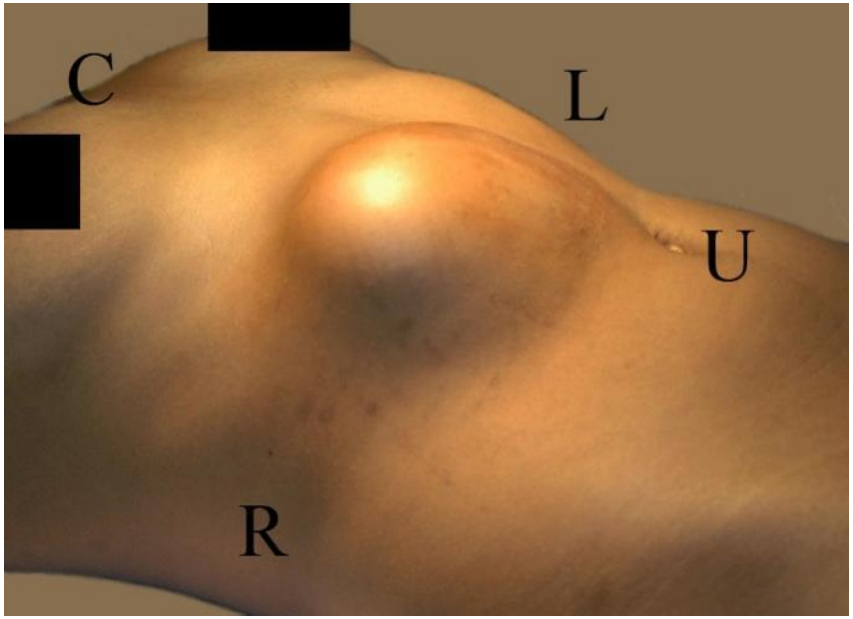
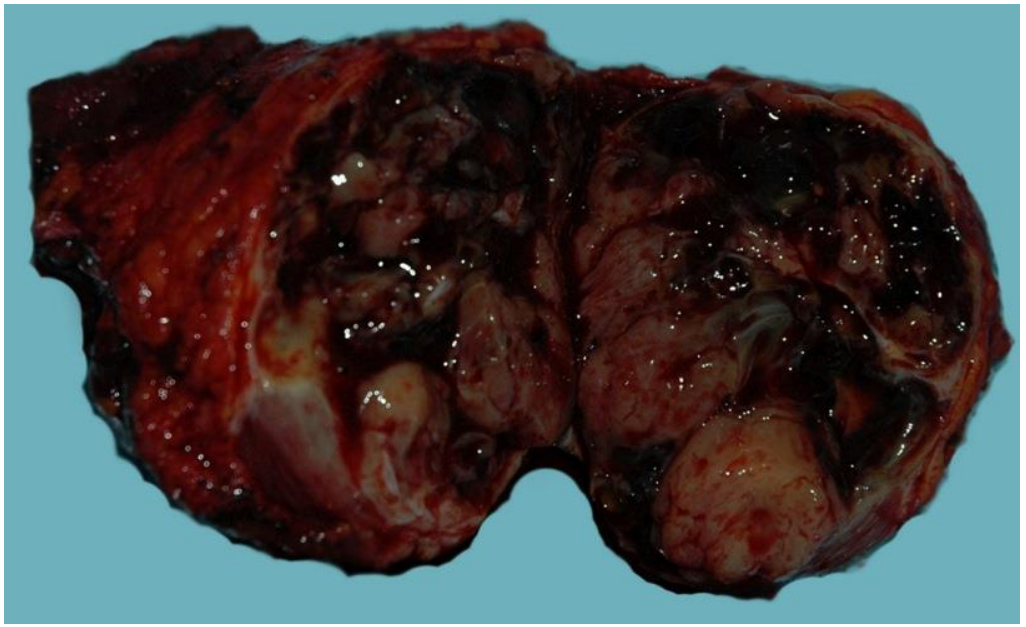
CASE STUDY

Large abdominal wall mass…What do you do?



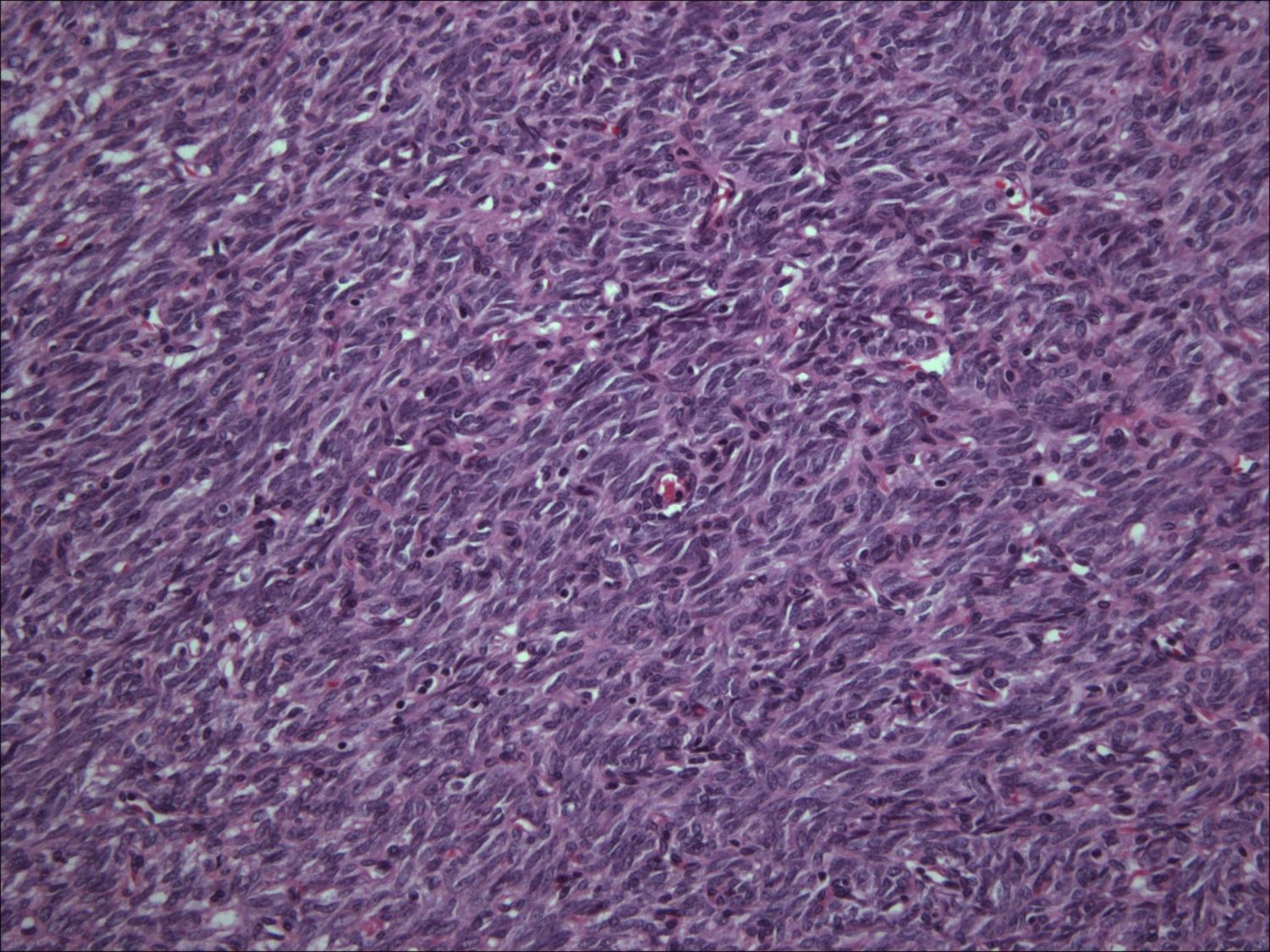


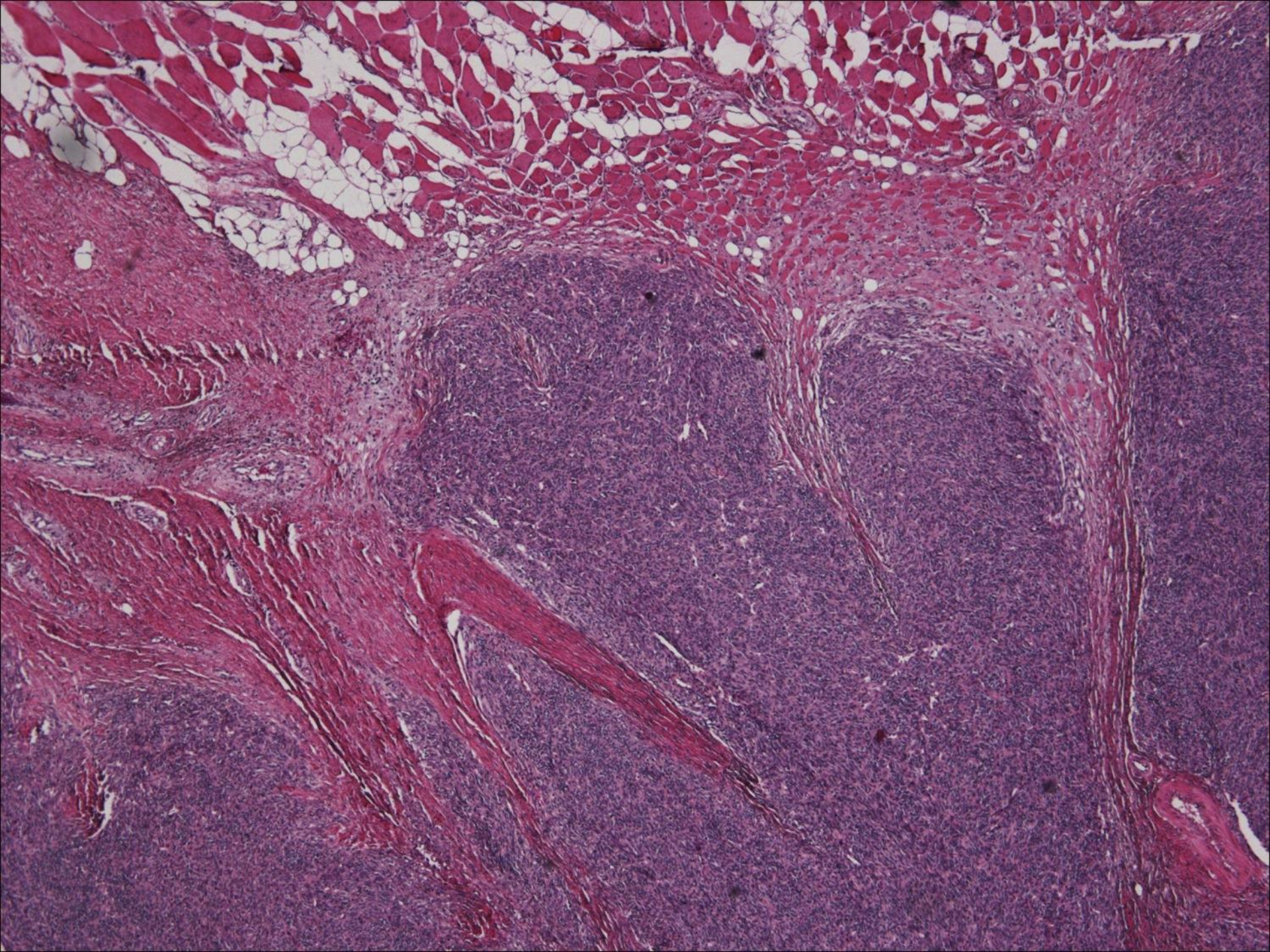
Biopsy?

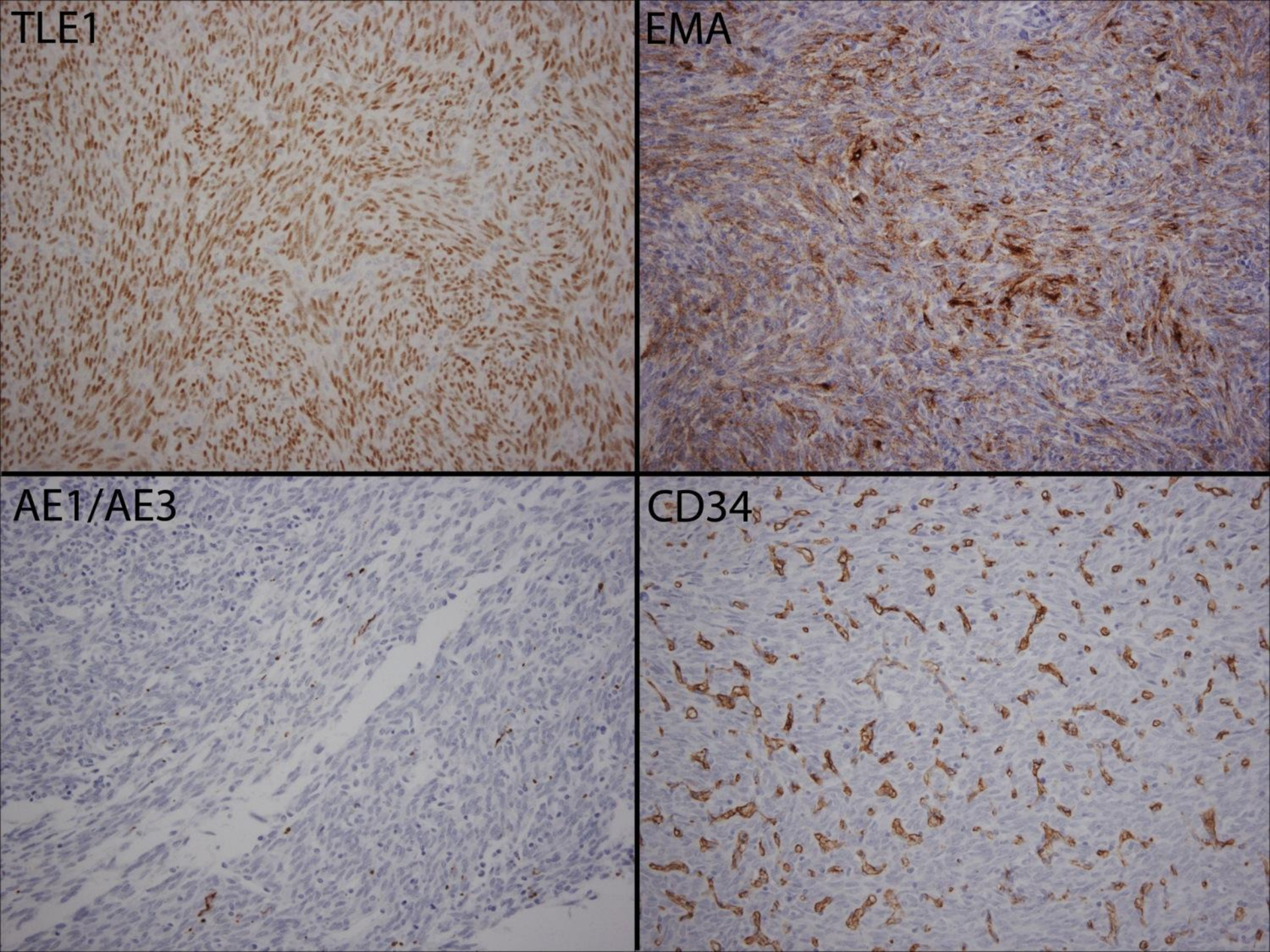
Large lesion… non-diagnostic?
Have to do additional surgery?
Benign or malignant?
Patient's desires?

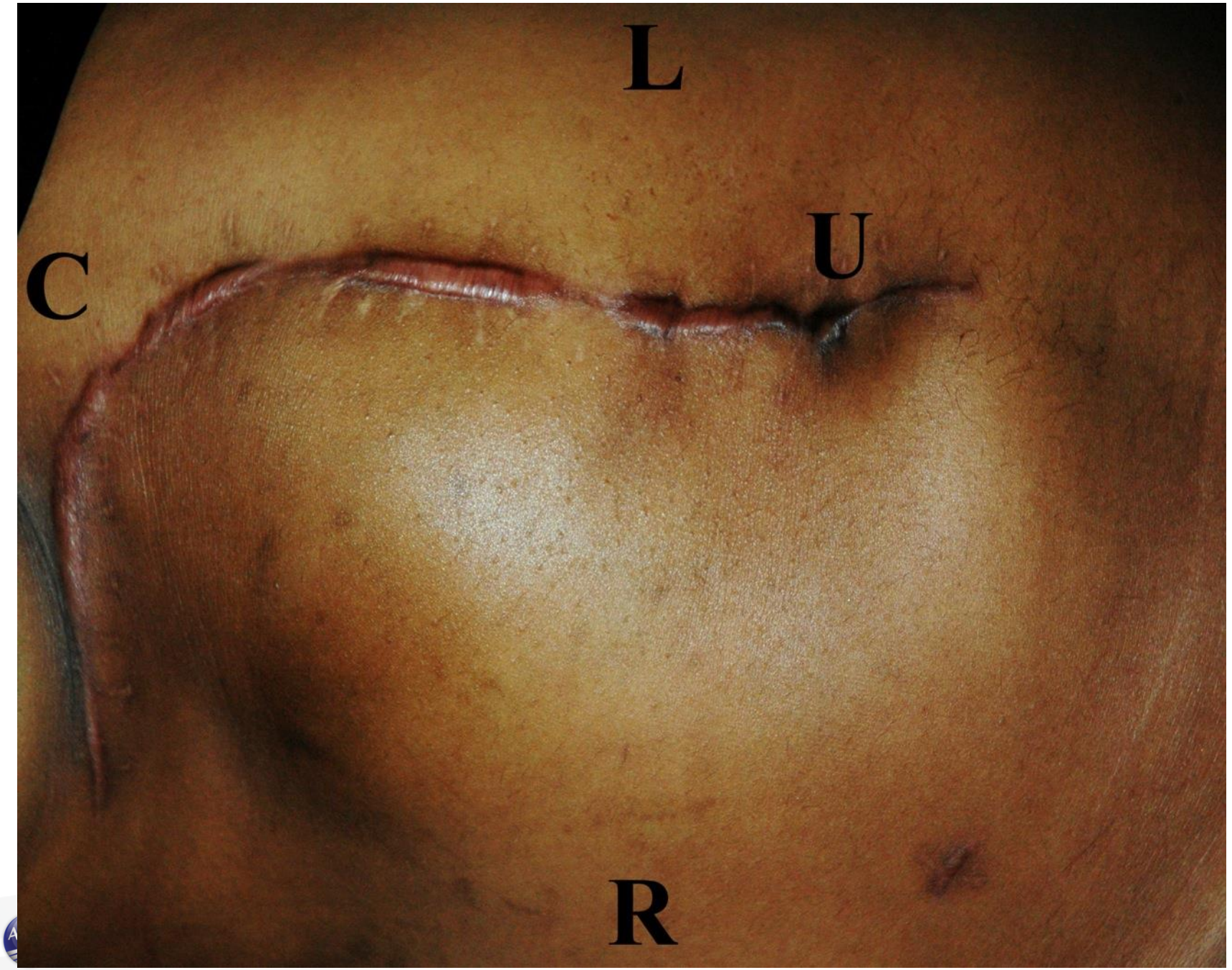
Resection?

Large lesion… repair of wall?
Definitive diagnosis
Patient's desires?






TLE1
EMA
AE1/AE3
CD34


L
C
U
R

Final Anatomical Diagnosis

Monophasic Synovial Sarcoma (malignant)
IHC* + for TLE-1 and EMA, - for keratin/CD34

Margins of resection are clear

Had adjuvant radiotherapy due to location

Patient disease free at 2 years with minimal abdominal wall scar

Important Features for a Successful Outcome in This Case…
Clinical photographs
Wide resection margins
Gross photo of tumor
Tissue placed in appropriate amount of formalin
Wide sampling of tumor
Access to immunohistochemistry

Site Assessment is the key to deploying the right tools

Site has…

Nothing

Site has…

Pathologist(s) but no lab

Site has…

Lab but no pathologist(s)

Site has…

Lab, pathologist but understaffed

Site has…

Lab, sufficient staff, but not meeting standard of care

Site has…

Lab, sufficient staff, and meets standard of care

Note:

1. "Site" could be any geographical area
2. Presence/absence of Oncologist/Surgeons

TABLE 2. Detailed Summary of 48 Cases From Haiti

Age	Sex	Clinical History	Diagnosis
5	F	Abdominal girth increase	Wilm's tumor
10	F	Eye tumor	High grade sarcoma
12	F	9 mo h/o neck mass	EBV and poorly differentiated carcinoma
12	F	Massive adenopathy, fevers, and fatigue	Precursor T lymphoblastic lymphoma/leukemia
15	F	Neck mass, h/o head, and neck cancer	Nondiagnostic (blood)
15	F	Anterior thigh mass	Malignant lymphoma (unusual Hodgkin)
20	F	2 y h/o rash on face, trunk, skin biopsy	Nonspecific inflammatory, organisms not detected
24	F	Multiple lip lesions	Condylomata
24	F	Eye protrusions × 3 y	Rosai-Dorfman disease
26	F	HIV −, rapid lymphadenopathy	T cell lymphoma
27	F	HIV+, CD4: 56, proptosis, multiple skin nodules	Diffuse large B cell
28	F	Lymphadenopathy, HIV+, CD4: 520	Caseating granulomata, organisms not detected
30	F	Neck mass	Nondiagnostic (blood)
33	F	Fatigue, WBC > 100,000	BCR-ABL translocation detected
35	F	Albino w/5 cm facial mass	Squamous cell carcinoma
35	F	Soft tissue mass on nose × 8 y	Pleomorphic adenoma
40	F	8 y h/o facial mass	Rosai-Dorfman disease
40	F	6 mo h/o palpable breast mass	Nonspecific involutional changes and inflammation
40	F	Lymphadenopathy, HIV+, AIDS	Necrotizing granulomata, acid fast bacilli present
43	F	Chronic myelogenous leukemia	9q34 ABL rearrangement c/w CML
48	F	Exophytic breast mass	Benign breast tissue
70	F	2 y h/o right leg mass	Porocarcinoma
73	F	Lymphadenopathy, fever, weight loss, night sweats	Necrotizing granulomata, acid fast bacilli present
80	F	6 mo h/o toe mass	Nonspecific inflammatory, did not correlate with "mass"
4	M	Cervical adenopathy, fatigue, and fevers	Precursor B-cell acute lymphoblastic lymphoma
8	M	HIV+, 6 mo h/o neck mass	Atypical Burkitt lymphoma
16	M	4 mo h/o ocular pain, headache, adenopathy, and vision loss	Nasopharyngeal carcinoma
18	M	1 y h/o lesions on leg	Nonspecific inflammatory, organisms not detected
21	M	5 mo h/o thigh mass	Malignant peripheral nerve sheath tumor
24	M	HIV+, with plaques on lower extremities	Kaposi sarcoma
28	M	Soft tissue lesion	Squamous cell carcinoma
29	M	1 y h/o lymphadenopathy	Metastatic undifferentiated carcinoma
36	M	HIV+, skin lesions	Kaposi sarcoma
41	M	Albinism and HIV+, with posterior neck lesion	Invasive squamous cell carcinoma
45	M	2 mo h/o enlarging gingival lesion, neck mass	Squamous cell carcinoma
47	M	2 y h/o leg lesion	Chromoblastomycosis
51	M	Fatigue	BCR-ABL translocation detected
64	M	Pleural effusion	Suspicious cells present
65	M	HIV+, on HAART with skin lesion	Kaposi sarcoma
68	M	14 mo h/o palate lesion	Actinomyces
9	U	Abdominal mass	Wilm's tumor

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PARTNERSHIPS

Entity Partnerships

Example: Partners in Health -> DFCI/BWH

Multiple sites with limited access to pathology

Clinicians/surgeons biopsy (by discretion)
Paid field workers of PIH

Pathologists review and report cases
Pro bono and absorb costs of processing

Clinical Oncologists provide therapy (as needed)
Pro bono and donate therapeutics

Entity Partnerships

PROS

Access to highest quality care
Cutting edge diagnostic
Serial follow up
Continuity of information

CONS

Sustainability
Volunteer fatigue
Under utilization
Capacity building?

COSTS: $$$$$$

Success in Entity Partnership

Requirements

Country commitment

Functioning, self-sustaining laboratory

Permanent, highly skilled pathologist(s)

Pathways to success

Data on outcome improvement, cancer statistics, morbidity/mortality

QA/QI, compliance, inspection

External/internal training with restrictions

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VOLUNTEERS

Individual Volunteers

Volunteers travel to foreign site

2 weeks to 6 weeks

Requires vacation time or departmental leave

Airfare, miscellaneous costs by volunteer
-Tax deductible?

Foreign site provides workspace, caseload, administrative support

Requires working laboratory with technicians and supplies to produce slides

Individual Volunteers - Malawi

Personal Experience

Visiting Malawi for 16 years

Two functioning pathologist
One is head of department, does all teaching of pathology in the medical school vice-principal of the college of medicine, runs the national cancer registry, etc…

Two is listed as 10% clinical service

Arrive January 3
Cases are from August

Depart January 24
Last case signed out is from January

Individual Volunteers - Malawi

Current Plan

Visiting Malawi for 16 years

Five to Seven permanent pathologists after 5 years
Two recruited/in training, Four additional being recruited (funded)

Volunteers from US/Europe/Canada welcome for the next 4 to 5 years (began in 2011)

Continuous coverage = improved turn around time

Continuous results = “retraining” of non-pathologist physicians

Restructuring flow of specimens with redistribution

Individual Volunteers

PROS

Access to highest quality care

Improved turn around time

- *With continuous volunteers*

Increased volume

Needs assessment

Teaching resources

CONS

Sustainability

-*Bridge to ?*

Capacity building

- *Trainees ?*

- *Physical Resources ?*

Success in Individual Volunteers

Requirements:

Financial support

Local plan for permanent pathologists to be placed

Pathways to success

Fundraising

Local pathologists empowered to trained new pathologists through sponsored programs *(MEPI/Afrohealth)*

Costs: $$$$

Pathology Outreach: Sharing Our Tools

What can we provide?

Accurate timely anatomic diagnoses for a range of surgical and oncological patients as part of staging, definitive treatment, or follow-through medical treatment

Work up and results are guided by endpoint resources

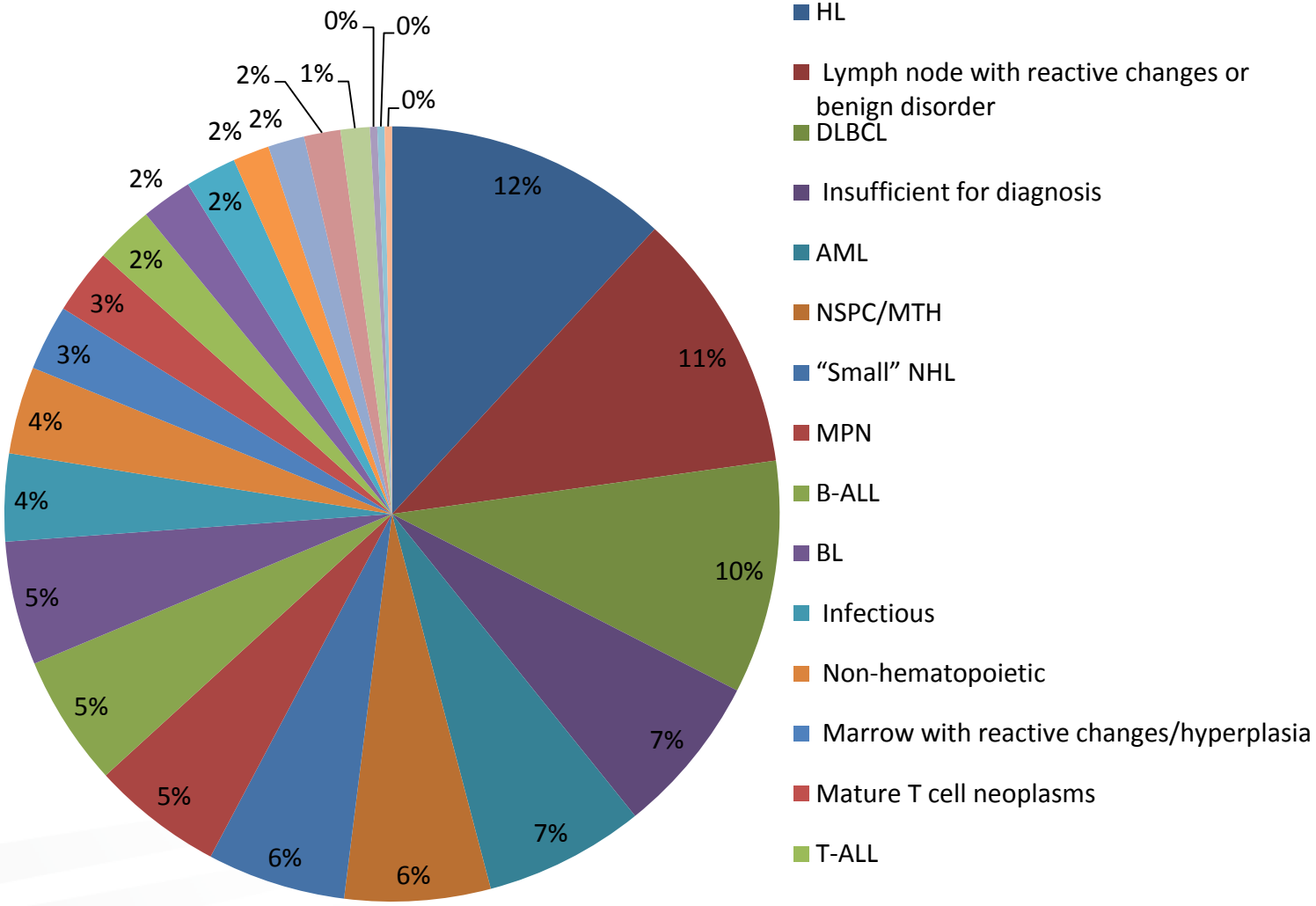
What can we gain?

Access to a wide range of exotic and challenging diagnostic material at home and abroad

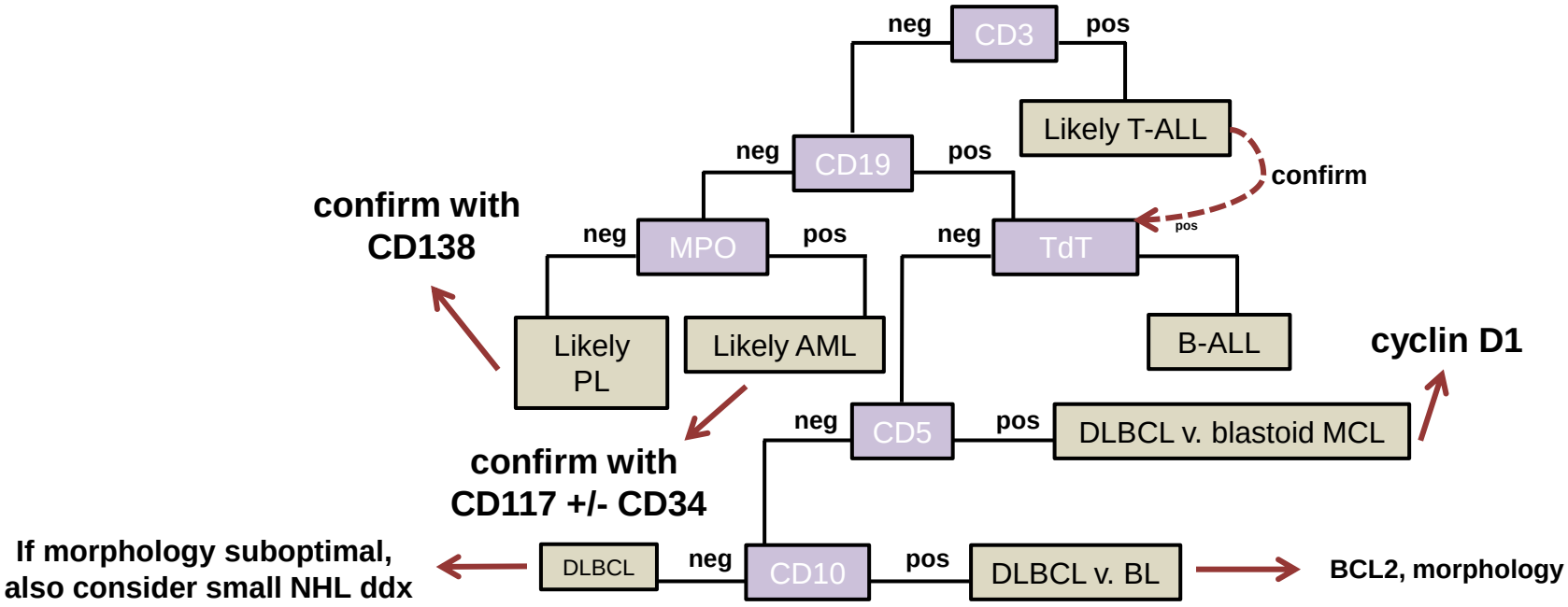
Improvement in our own diagnostics processes

!

376 Hemepath PIH Cases Received at BWH
(~2007-present)



Diagnostic Panel for PIH Hemepath Cases and Confirmatory Study



Available therapies

Hodgkin lymphoma: ABVD
Non-Hodgkin lymphoma: CHOP
Burkitt lymphoma: COMP/COP
ALL: combination regimen
CLL: Chlorambucil oral or COP

CML: Gleevec (***ONLY if confirmed BCR-ABL***)
Myeloma: in process
AML: only palliative steroids/hydroxyxurea
MDS: no therapy
Aplastic anemia: no therapy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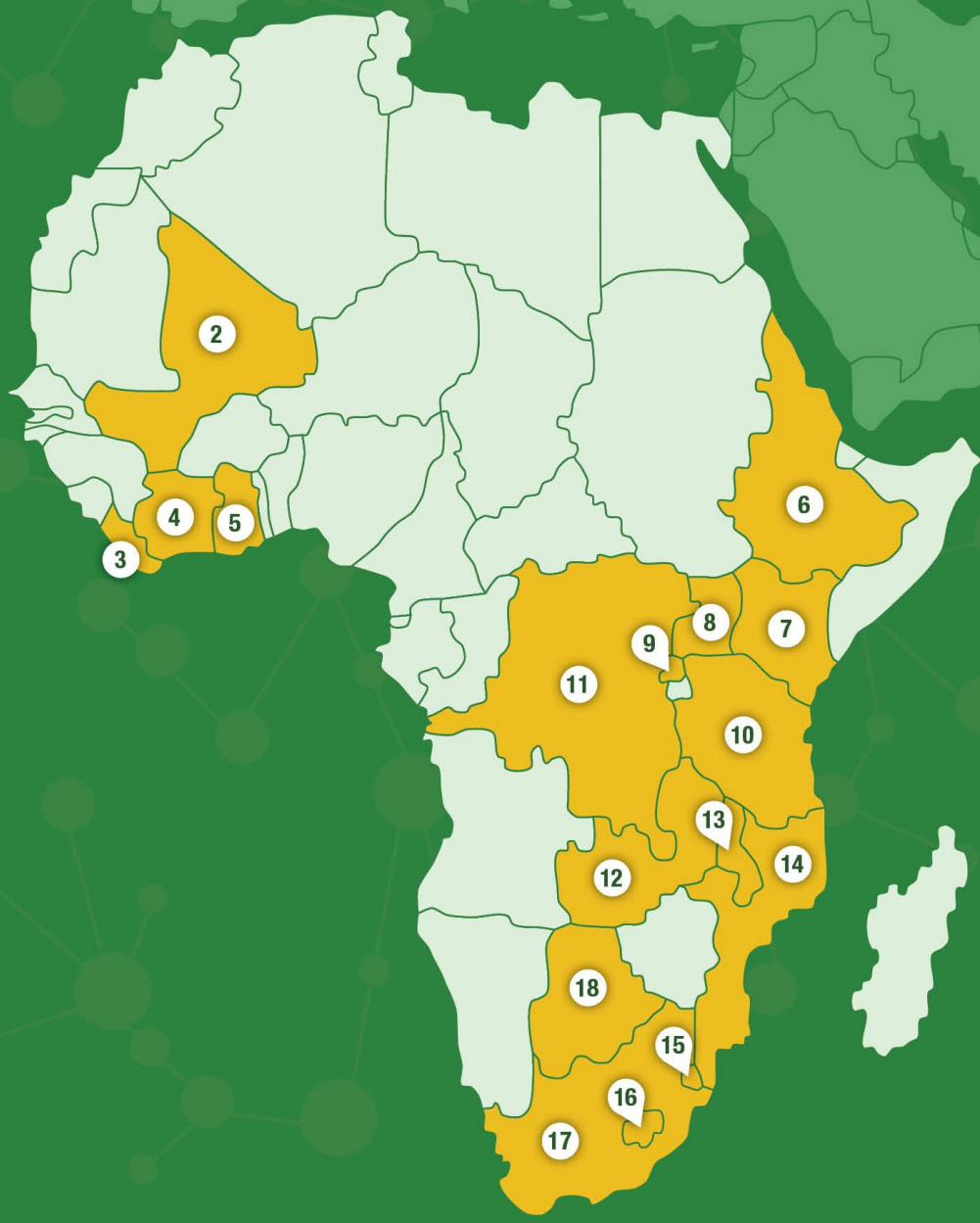
ASCP
Digital Cloud
Leapfrog
Histopathology /
Telepathology
Process

Locations

1. Haiti
2. Mali
3. Liberia
4. Ivory Coast
5. Ghana
6. Ethiopia
7. Kenya
8. Uganda
9. Rwanda
10. Tanzania
11. Congo
12. Zambia
13. Malawi
14. Mozambique
15. Swaziland
16. Lesotho
17. South Africa
18. Botswana



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Care & Treatment

Location Education & Training

Lessons Learned

Country Readiness Assessment

Collaboration with Ministries

Expand Partners Network

Funding

Our Partners

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Thank You!

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